

CLAIMS

What is claimed:

1. A parallel interference cancellation apparatus for sequentially
5 canceling interference in asynchronous signals received from respective users or
paths in a code division multiple access system using multiple transfer rates, the
apparatus comprising:

a signal reproducing means for performing de-spreading operation of the
received signals from the respective users or paths and then reproducing said signals
10 using a channel estimation value;

a remaining signal generating means for summing said reproduced signals
on a corresponding receive time axis and subtracting said summed signals from said
input received signals to generate remaining signals;

a de-spreading means for summing the remaining signals generated by said
15 remaining signal generating means to said signals from the respective users or paths
to generate signals from which interference is cancelled and for performing a de-
spreading operation on the interference cancelled signals;

a rate detection means for receiving the signals from respective users or
paths to detect multiple transmission rates and an asynchronous trigger point for
20 respective users; and

a controller for controlling said signal reproduction means, said remaining
signal generating means and said de-spreading means using said multiple rates and
said asynchronous trigger point for respective users.

25 2. The parallel interference cancellation apparatus according to claim 1,
wherein during the time when one period of a signal having the longest bit period
among said signals received with multiple transfer rates, other signals having a
shorter period is repeatedly processed by said signal reproduction means, said

remaining signal generating means and said de-spreading means to match the period of the signals to that of the signal having the longest period before canceling the interference from the signals.

5 3. The parallel interference cancellation apparatus according to claim 1, wherein the process of said remaining signal generating means starts when said signal reproducing means completes the reproduction of the signal having the fastest phase among the signals received from the respective users or paths.

10 4. The parallel interference cancellation apparatus according to claim 1, wherein said remaining signal generating means provides said reproduced signals to said de-spreading means when the reproduction of a portion of the signals for a user or a path having the most late phase is completed, and said portion of the signal overlapping with the signals received from a previous user or a previous path having
15 the most late phase in a time axis.

20 5. The parallel interference cancellation apparatus according to claim 1, wherein a plurality of said signal reproducing means, said remaining signal generating means and said de-spreading means constitutes a multi-stage structure.

 6. A method for sequentially canceling interference of asynchronous signals received from respective users or paths a code division multiple access system using multiple transfer rates, said method comprising the steps of:

25 (a) performing a signal de-spreading operation and signal reproducing operation using a channel estimation value with respect to the signals received from the respective users or paths;

 (b) summing said reproduced signals of the respective users or paths on a corresponding time axis and subtracting the some of said reproduced signals from

the signals received from the respective users or paths to generate remaining signals;
and

(c) summing said remaining signals and said signals received from the
respective users or paths to generate signals from which interference is cancelled
5 and performing a de-spreading operation to the interference cancelled signals;

wherein each of said steps (a), (b) and (c) are repeated only to perform the
designate operations with respect to the input signals to provide the operation result
to a next step.

10 7. The method for sequentially canceling parallel interference according
to claim 6, wherein said step (b) starts when the reproduction of signals having the
fastest phase among the received signals for the respective users or paths is
completed in said step (a).

15 8. The method for sequentially canceling parallel interference according
to claim 6, wherein said step (c) starts when the reproduction operation is completed
with respect a portion of the signals having the most late phase among the signals
from a user or a path overlapping in the time axis with the signals for a previous
user or a previous path having the most late phase.

20 9. The method for sequentially canceling parallel interference according
to claim 6, wherein while processing one period of signals having the longest bit
period among signals received at multiple transfer rates, said steps (a) to (c) are
repeatedly performed with respect to signals having shorter period to match the
25 period of signals to the longest signal period.

10. The method for sequentially canceling parallel interference according to claim 6, wherein each of said steps (a) to (c) are repeatedly performed in a multi-stage structure.

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